

# EV

## Produkt - Information

### FORCE 10 · 12 · 15



MODEL  
**FORCE 10**



MODEL  
**FORCE 12**

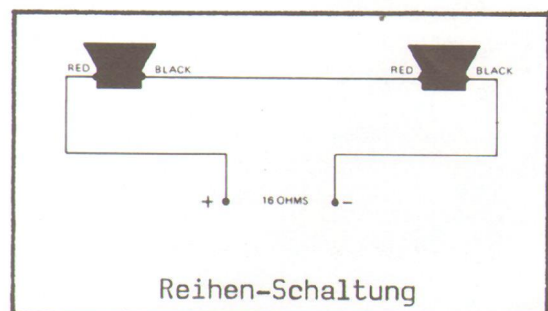
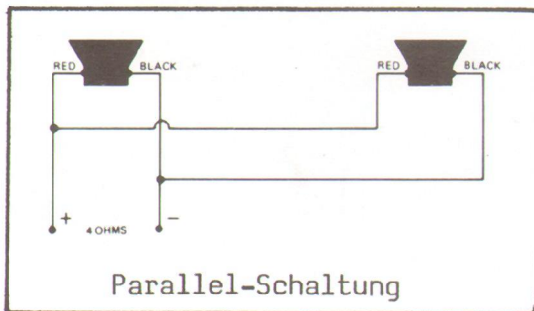


MODEL  
**FORCE 15**

Die Force 10, 12 und 15 Zoll Lautsprecherserie wurde speziell für den professionellen Musikinstrumenten- und PA-Einsatz entwickelt.

Sie eignet sich besonders als Austauschlautsprecher für einfache Blechchassis wie sie oft in Instrumentenverstärkern eingebaut sind. Die Konstruktion des Force Lautsprechers bietet bei gutem Preis/Leistungsverhältnis hohe Belastbarkeit (150 W Sinus), einen stabilen Aluminium-Spritzgußkorb, eine 4,5 kg schwere Magnetstruktur sowie eine nach Thiele/Small Parameter abgestimmte Membrankonstruktion. Dies alles sorgt für die außergewöhnliche Betriebssicherheit und einen guten Sound. Der höhere Wirkungsgrad bietet außerdem eine bessere Ausnutzung der zur Verfügung stehenden Verstärkerleistung.

Die Force-Serie läßt sich sowohl vorderseitig sowie rückwärtig montieren. Für die Montage ist das Kit SMH-1 erhältlich. Optimierte Abstimmstabellen für verschiedene Gehäusegrößen nach Thiele/Small sind bei EV erhältlich. Die Garantiezeit für die Force-Modelle beträgt 5 Jahre.



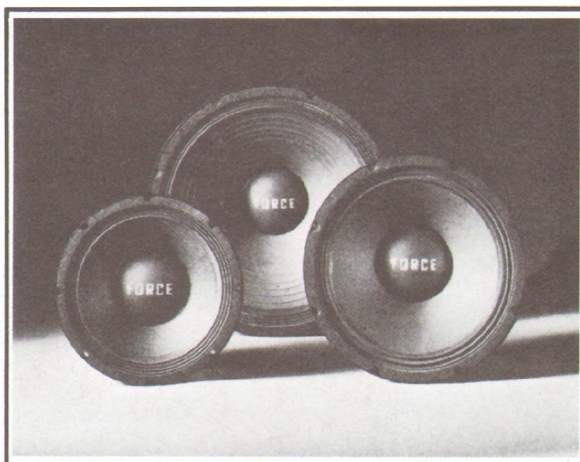
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## Technische Daten

# EV



# FORCE™

## 10/12/15

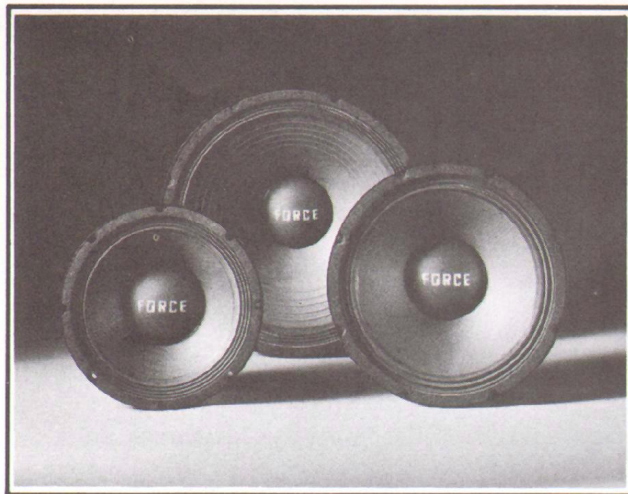
### Musical Instrument Loudspeakers

	Force 10	Force 12	Force 15
Außendurchmesser	254 mm 10 in.	305 mm 12 in.	381 mm 15 in.
Nominelle Impedanz	8 ohms	8 ohms	8 ohms
Sinusleistung	150 watts	150 watts	150 watts
Schalldruck, 1 W/1 m bei nomineller Impedanz	98 dB	99 dB	100 dB
	75-7000 Hz	60-7000 Hz	45-6000 Hz
Spulendurchmesser	63,5 mm	63,5 mm	63,5 mm
Magnetstruktur Gewicht	4,54 kg	4,54 kg	4,54 kg
Schallwandöffnung	229 mm	279 mm	353 mm
(Front- und rückwärtige Montage)	259 mm	310 mm	384 mm
Gesamttiefe	122 mm	130 mm	163 mm
Nettogewicht	5,44 kg	5,8 kg	5,8 kg
Korbaufbau	Aluminium Spritzguß		

	Force 10	Force 12	Force 15
Außendurchmesser	254 mm 10 in.	305 mm 12 in.	381 mm 15 in.
Nominelle Impedanz	8 ohms	8 ohms	8 ohms
Sinusleistung	150 watts	150 watts	150 watts
Schalldruck, 1 W/1 m bei nomineller Impedanz	98 dB	99 dB	100 dB
	75-7000 Hz	60-7000 Hz	45-6000 Hz
Spulendurchmesser	63,5 mm	63,5 mm	63,5 mm
Magnetstruktur Gewicht	4,54 kg	4,54 kg	4,54 kg
Schallwandöffnung	229 mm	279 mm	353 mm
(Front- und rückwärtige Montage)	259 mm	310 mm	384 mm
Gesamttiefe	122 mm	130 mm	163 mm
Nettogewicht	5,44 kg	5,8 kg	5,8 kg
Korbaufbau	Aluminium Spritzguß		

### Thiele - Small Parameter

fs. Resonanzfrequenz	65 Hz	55 Hz	40 Hz
Qts Gesamt Q bei fs.	.38	.44	.51
Vas Gehäusevolumen bei gleicher Luftpolstersteife	.0425 m <sup>3</sup>	.0878 m <sup>3</sup>	.2974 m <sup>3</sup>
$\eta_0$	2,6 %	2,9 %	3,3 %
Vd. max. Verdrängungsvolumen der Membrane	104,4 cm <sup>3</sup>	166,2 cm <sup>3</sup>	282,2 cm <sup>3</sup>
Sd Effektive Membranfläche	316,1 cm <sup>2</sup>	503,3 cm <sup>2</sup>	855,3 cm <sup>2</sup>
Xmax-max. lineare Auslenkung	3,3 mm	3,3 mm	3,3 mm
Re Gleichstromwiderstand der Spule	5,2 ohms ± 10 %	5,2 ohms ± 10 %	5,2 ohms ± 10 %



# FORCE™

## 10/12/15

### Musical Instrument Loudspeakers

#### SPECIFICATIONS

	FORCE 10	FORCE 12	FORCE 15
Nominal Diameter	254 mm 10 in.	305 mm 12 in.	381 mm 15 in.
Nominal Impedance	8 ohms	8 ohms	8 ohms
Long Term Average Power Handling Capacity (per EIA Standard RS426A)	150 watts	150 watts	150 watts
Sound Pressure Level at 1 Meter, 1 Watt into Nominal Impedance (using spectrum specified in EIA Standard SE103 Section SE3).	98 dB	99 dB	100 dB
Usable Frequency Response	75-7000 Hz	60-7000 Hz	45-6000 Hz
Voice Coil Diameter	63.5 mm 2.5 in.	63.5 mm 2.5 in.	63.5 mm 2.5 in.
Magnetic Assembly Weight	4.54 kg 10 lb	4.54 kg 10 lb	4.54 kg 10 lb
Baffle Opening Diameter (front or rear mounting)	229 mm 9 in.	279 mm 11 in.	353 mm 13.88 in.
Overall Diameter	259 mm 10.2 in.	310 mm 12.2 in.	384 mm 15.1 in.
Overall Depth	122 mm 4.8 in.	130 mm 5.1 in.	163 mm 6.4 in.
Net Weight	5.44 kg 12.0 lb	5.8 kg 12.8 lb	5.8 kg 12.8 lb
Frame Composition	diecast aluminum	diecast aluminum	diecast aluminum

#### Thiele-Small Parameters

$f_s$ Free-Air Resonance Frequency	65 Hz	55 Hz	40 Hz
$Q_{ts}$ Total Q at $f_s$	.38	.44	.51
$V_{as}$ Volume of Air Having Same Acoustic Compliance as Driver Suspension	.0425 m <sup>3</sup> 1.5 ft <sup>3</sup>	.0878 m <sup>3</sup> 3.1 ft <sup>3</sup>	.2974 m <sup>3</sup> 10.5 ft <sup>3</sup>
$\eta_o$ Half-Space Reference Efficiency	2.6%	2.9%	3.3%
$V_d$ Peak Displacement Volume of Diaphragm	104.4 cm <sup>3</sup> 6.4 in <sup>3</sup>	166.2 cm <sup>3</sup> 10.1 in <sup>3</sup>	282.2 cm <sup>3</sup> 17.2 in <sup>3</sup>
$S_d$ Effective Diaphragm Area	316.1 cm <sup>2</sup> 49 in <sup>2</sup>	503.3 cm <sup>2</sup> 78 in <sup>2</sup>	855.3 cm <sup>2</sup> 132.6 in <sup>2</sup>
$X_{max}$ Peak Linear Displacement of Diaphragm	3.3 mm .13 in.	3.3 mm .13 in.	3.3 mm .13 in.
$R_e$ DC Resistance of Voice Coil	5.2 ohms $\pm$ 10%	5.2 ohms $\pm$ 10%	5.2 ohms $\pm$ 10%

#### DESCRIPTION

The FORCE 10, 12, and 15 inch loudspeakers are designed for professional high level, high quality musical instrument and sound reinforcement systems. Power capabilities are 150 watts per EIA Standard RS-426A.

The construction of FORCE loudspeakers features a low mass voice coil on a rugged laminated Polyimide coil form, driven by a 10 lb magnetic structure. Also featured are a heavy duty curvilinear cone and a fatigue-resistant cone suspension. Both the coil and magnetic structure are vented. All of this is packaged in a husky eight-spoke diecast aluminum frame with a heat radiating finned back cover.

FORCE speakers may be front or rear mounted without an adapter. The optional SMH-1 speaker mounting kit, including T-nuts and complete mounting instructions facilitates front mounting.

#### POWER HANDLING TEST

The FORCE 10, 12, and 15 are designed to withstand the power test described in EIA Standard RS-426A. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with the usual constant-percentage bandwidth analyzer (one-third octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1200 Hz with a 3-dB-per-octave slope above 1200 Hz. This shaped signal is sent to the power amplifier with the continuous power set at 150 watts into the 5.6 ohms EIA equivalent impedance (29 volts true RMS). Amplifier clipping sets instantaneous peaks at 6 dB above the

continuous power, or 600 watts peak (58 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

## RECOMMENDED ENCLOSURES

### Replacement use in existing enclosures

FORCE loudspeakers will often be used to replace inferior speakers in existing enclosures. Mechanical and electrical characteristics are such that the superior efficiency, sound quality, and reliability of FORCE loudspeakers will be realized in virtually any sealed, vented (bass reflex), horn, or open-backed enclosure.

## VENTED ENCLOSURES

The most extended, lowest distortion, and best controlled bass performance is usually realized in properly designed vented enclosures. In such designs, the vent, or port, actually reproduces the lowest octave or so of bass response. The vent is driven to full acoustic output by a relatively small motion of the speaker cone itself, acting through the air contained within the enclosure. The excursion of the speaker at these frequencies is much reduced compared to sealed or open-backed enclosures, directly reducing harmonic distortion and the possibility of speaker "bottoming."

## INSTALLATION

FORCE speakers may be front or rear mounted, although front mounting is preferred because of convenience. For simple front mounting, the convenient SMH-1 mounting accessory is recommended. Complete mounting instructions are included with the SMH-1. Instructions for standard front mounting are given below. It is important that recommended baffle openings and mounting hole locations be followed as stated in the specifications table.

For front mounting, mark baffle opening and screw locations on the blank panel first. Drill the screw holes before cutting the large baffle opening. If 1/4-20 screws are used, four screws are sufficient for secure mounting of the speaker. T-nuts are recommended for simple, secure mounting. If T-nuts are used, the holes should be .28" diameter (letter L drill). Apply glue to the flanges

of 1/4-20 long shank T-nuts before driving into the rear of the holes.

Sealing of the front-mounted speaker is accomplished with the adhesive-backed foam gasket segments. Strip off protective paper and apply gasket to the rear mounting surface of the speaker rim, making certain that holes in the gasket line up with the mounting holes in the speaker frame.

Length of the 1/4-20 screws should be 1/2" plus the panel thickness when using T-nuts. The screws must have fillister heads to seat down in the recess of the speaker frame. Screws should be tightened evenly and securely. Maximum torque possible with a proper size screwdriver should be sufficient.

**IMPORTANT!** When front mounting, the screw head must fit down into the front gasket cutout.

Rear mounting requires the same diameter cutout and screw circle as front mounting. Other comments regarding the use of T-nuts apply to rear mounting as well.

Screw length should be 3/4" plus panel thickness if using T-nuts — longer for standard hex nuts. If hex nuts are used, a second nut should be tightened against the first nut to prevent loosening during operation. A lock washer and flat washer are recommended between the screw head and frame.

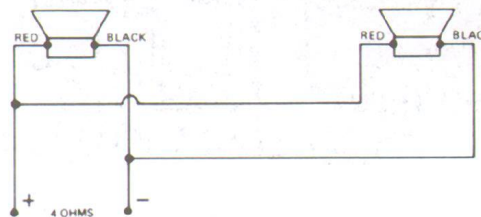
Screws should be tightened evenly, but not excessively. Maximum torque possible with a proper size screwdriver should be sufficient. Do not use adhesive-back gasket segments for rear mounting.

If a cabinet is to be constructed from scratch, 3/4-inch solid and jointed or marine plywood is recommended. After construction, be certain interior is completely free of metal filings, wood chips, etc.

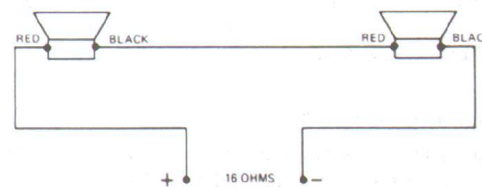
## CONNECTIONS

Use No. 18 or larger stranded wire to connect the two terminals on the loudspeaker to the amplifier output. If a choice of amplifier output impedance is available (4, 8, 16 ohms), a single

FORCE speaker should be connected to the 8-ohm tap. Two FORCE speakers may be connected in parallel as shown in Figure 1. Be sure to connect the red terminals together. If series wiring is desired, wiring and polarity should follow Figure 2.



**FIGURE 1**  
Connection of 2 FORCE  
Speakers in Parallel



**FIGURE 2**  
Connection of 2 FORCE  
Speakers in Series

## WARRANTY (Limited) —

FORCE Loudspeakers and accessories are guaranteed for five years from date of original purchase against malfunction due to defects in workmanship and materials. If such malfunction occurs, unit will be repaired or replaced (at our option) without charge for materials or labor if delivered prepaid to the proper Electro-Voice service facility. Unit will be returned prepaid. Warranty does not cover finish, appearance items, burned coils, or other malfunction due to abuse or operation at other than specified conditions. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee.

For repair information and service locations, please write: Service Department, Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107 (Phone 616/695-6831) or 8234 Doe Avenue, Visalia, CA 93277 (209/625-1330,-1).

Electro-Voice also maintains complete facilities for non-warranty service of E-V products.

Specifications subject to change without notice.



# FORCE™

## Musical Instrument Loudspeakers



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# FORCE™

## Musical Instrument Loudspeakers

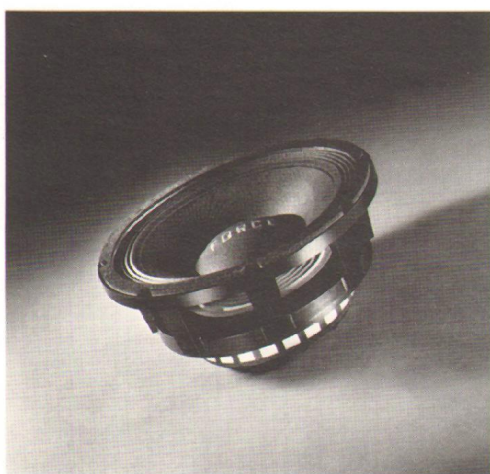
Force™ musical instrument loudspeakers offer everything you're looking for in a replacement loudspeaker. Rugged diecast frames, heavy-duty motor parts and a massive magnet assembly combine to offer you superb performance.

Performance can be summed up in two words – sound and power-handling capability. Force gives you both. The sound you want is there. It's the sound that will have your instrument cutting through with the authority you thought you could only get with a premium-priced speaker. And with Force's 150 watt (real-life rated) long-term power-handling

capability, you're not going to be blowing out speakers every time you need to punch in a little more volume.

Force is the professional speaker you've been looking for. Yet Force costs only slightly more than you'd expect to pay for a common stamped-frame loudspeaker.

Force speakers are available in 10," 12" and 15" models so you can load them into just about every existing or custom cabinet you can dream up.



### MODEL FORCE™ 10

#### Specifications

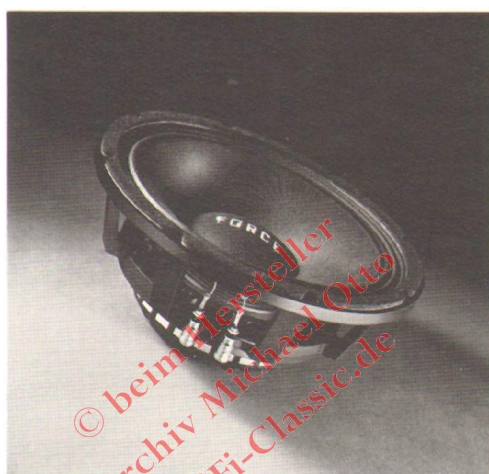
**Frequency Response:** 75-7,000 Hz  
**Sound Pressure Level:** 118 dB  
 (at 4', 150 watts in)

**Long-Term Power Handling Capacity:** 150 watts (per EIA Standard RS-426A)

**Nominal Impedance:** 8 ohms  
**Voice Coil Diameter:** 63.5 mm (2.5 in.)

**Magnet Assembly**  
**Weight:** 4.54 kg (10 lbs.)  
**Frame:** Diecast aluminum

**Dimensions:**  
**Overall Diameter:** 259 mm (10.2 in.)  
**Overall Depth:** 122 mm (4.8 in.)  
**Weight:** 5.44 kg (12 lbs.)



### MODEL FORCE™ 12

#### Specifications

**Frequency Response:** 60-7,000 Hz  
**Sound Pressure Level:** 119 dB  
 (at 4', 150 watts in)

**Long-Term Power Handling Capacity:** 150 watts (per EIA Standard RS-426A)

**Nominal Impedance:** 8 ohms

**Magnet Assembly**  
**Weight:** 4.54 kg (10 lbs.)  
**Frame:** Diecast aluminum

**Dimensions:**  
**Overall Diameter:** 310 mm (12.2 in.)  
**Overall Depth:** 130 mm (5.1 in.)  
**Weight:** 5.8 kg (12.8 lbs.)



### MODEL FORCE™ 15

#### Specifications

**Frequency Response:** 45-6,000 Hz  
**Sound Pressure Level:** 120 dB  
 (at 4', 150 watts in)

**Long-Term Power Handling Capacity:** 150 watts (per EIA Standard RS-426A)

**Nominal Impedance:** 8 ohms  
**Voice Coil Diameter:** 63.5 mm (2.5 in.)

**Magnet Assembly**  
**Weight:** 4.54 kg (10 lbs.)  
**Frame:** Diecast aluminum

**Dimensions:**  
**Overall Diameter:** 384 mm (15.1 in.)  
**Overall Depth:** 163 mm (6.4 in.)  
**Weight:** 5.8 kg (12.8 lbs.)



**Electro-Voice**® a gulton company

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**Warranty (Limited)** – Force Loudspeakers and accessories are guaranteed for five years from date of original purchase against malfunction due to defects in workmanship and materials. If such malfunction occurs, unit will be repaired or replaced (at our option) without charge for materials or labor if delivered prepaid to the proper Electro-Voice service facility. Unit will be returned prepaid. Warranty does not cover finish, appearance items, burned coils, or other malfunction due to abuse or operation at other than specified conditions. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee.

Electro-Voice engineering continually improves existing products, as well as creating new ones. Thus specifications given in this brochure are subject to change without notice. For complete specifications consult the appropriate Force Loudspeaker Engineering Data Sheet. Each Force data sheet has a complete description of the Force power tests.